

## ABSTRACT OF THE DISCLOSURE

Electro-optically operated transmitters containing a wave guide liquid crystal beam steering device in series of fine beam steering devices as well as electrically switchable mirror are disclosed. The wave guide beam steering device is constructed on a planar lightwave circuit that  
5 contains a plurality of liquid crystal switching elements intersecting a plurality of optical wave guides and one main wave guide that has a curvature for light propagation. The transceiver is capable of continuously steering multiple beams of light into separate independent directions with a field-of-regard close to  $4\pi$ . The resulted optical transmitter device is motionless, polarization sensitive or insensitive, stable within the operational spectral region, and stable  
10 versus temperature. When an optical receiver is integrated, the transmitters become transceivers. The invention also includes the methods for manufacturing the wave guide beam steering device.

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